

## ABSTRACT

A high-pressure side discharge port of a two-stage compressor (12A) and a condenser (14A) are connected, condenser (14A) and a PMV (15A) are connected, a refrigerating side exit of PMV (15A) is connected to a medium pressure side suction port of two-stage compressor (12A) via an R capillary tube (16A) and an F evaporator (18A), connected to an F evaporator (26A) via an F capillary tube (24A), F evaporator (26A) is connected to a low-pressure side suction port of two-stage compressor (12A) via a low-pressure suction pipe (28A), PMV (15A) can switch a simultaneous cooling mode and a freezing mode, and in the simultaneous cooling mode, a refrigerant flow rate toward R evaporator (18A) is adjusted by PMV (15A), and thereby a temperature difference control is performed so as to make a difference between an entrance temperature and an exit temperature of R evaporator (18A) equal to a preset temperature difference (for example, 4°C).

A controller (22), on the basis of the detection condition of a temperature sensor (23) for a freezing chamber and a temperature sensor (24) for a refrigerating chamber, controls a freezing cycle device (10). Here, controller (22) controls an opening of a regulating valve (12) so as to make a superheat amount which is a difference between an exit temperature and an entrance

temperature of a refrigerating evaporator (5) equal to a target superheat amount, and thereby adjusts a refrigerant flow rate to refrigerating evaporator (5) in a limited state.

In this case, when a power is turned on, the entrance temperature and the exit temperature of refrigerating evaporator (5) are the same, so that controller (22), when the power is turned on, calibrates detected temperatures of an entrance temperature sensor (27) and an exit temperature sensor (26) so as to coincide with each other, and thereby can execute surely the subsequent limiting adjustment of regulating valve (12) on the basis of the superheat amount.

Further, in this case, when a refrigerant supply to refrigerating evaporator (5) is stopped and the temperature of refrigerating evaporator (5) rises suddenly, controller 22 increases an opening of a valve opening (42) to refrigerating evaporator (5) of regulating valve (12) to a predetermined return value, so that the refrigerant supply amount to refrigerating evaporator (5) is increased at a stretch, and thus the refrigerating evaporator can be cooled quickly.

A refrigerator having a two-stage compressor (12A) for cooling efficiently both a refrigerating chamber (2A) and a freezing chamber (5A) will be provided.

When limiting and adjusting a refrigerant flow rate to

one evaporator according to an opening of a valve body so as to make a superheat amount of one evaporator appropriate on the basis of the superheat amount which is a difference between an exit temperature and an entrance temperature of one evaporator, a refrigerator for detecting accurately the entrance temperature and the exit temperature of one evaporator will be provided.

When limiting and adjusting a refrigerant flow rate to one evaporator according to an opening of a valve body, a refrigerator for causing no delay in a refrigerant supply to one evaporator will be provided.